REMARKS

The present Amendment and Response is submitted in response to the Office Action, dated August 27, 2003, where the Examiner has rejected claims 1-5, 7, 9-27 and 42-60. By the present amendment, applicant has canceled claims 1-5, 7, 9-15, 42-44, 46-47 and 50-60, and amended claims 16 and 22. Accordingly, after the present amendment, claims 16-27, 45, 48 and 49 are pending in the present application. Reconsideration and allowance of pending claims 16-27, 45, 48 and 49 in view of the following remarks are respectfully requested.

A. Rejection of Claims 53-60 Under 35 USC § 103(a)

The Examiner has rejected claims 53-60 under 35 USC § 103(a) as being anticipated by Stewart, et al. (USPN 5,761,634) ("Stewart") in view of known prior art. Applicant respectfully disagrees; however, in order to expedite the prosecution of the present application, applicant has canceled claims 53-60. Accordingly, the Examiner's rejection of claims 53-60 has been rendered moot.

B. Rejection of Claims 1, 3-6, 9-16, 18-27 and 42-52 Under 35 USC § 103(a)

The Examiner has rejected claims 1, 3-6, 9-16, 18-27 and 42-52 under 35 USC § 103(a) as being unpatentable over Stewart in view of Otani (USPN 6,400,693) ("Otani"). Applicant respectfully disagrees; however, in order to expedite the prosecution of the present application, applicant has canceled claims 1, 3-6, 9-15, 42-44, 46-47 and 50-52, and applicant has further amended claims 16 and 22 to clarify the invention of claims 16 and 22.

Stewart describes variable rate encoders (col. 3, line 65) in conjunction with variable encoding standard TIA IS96 (col. 4, line 29) and further states that each speech encoder (105) includes rate determination capability (col. 4, lines 31-34.) In sharp contrast, claim 16 has been amended to recite: "A method of enhancing an installed speech coding system that has been in

use for encoding a speech signal", where "said installed speech coding system including a plurality of installed speech encoders" and the method comprises the steps of: providing a rate determinator module; connecting said rate determinator module to said installed speech coding system; receiving said plurality of speech signal frames by said rate determinator; determining a data rate of one of said speech signal frames by said rate determinator ...."

As described in the present application, conventionally multi-rate network providers have taken advantage of multi-rate encoders designed in compliance with G.723, G.726, G.727, G.729 Annex I and G.723.1 standards to design multi-rate systems. Network providers, such as AT&T, MCI or Sprint, control data bit rates according to predetermined factors, such as time of the day or particular usage of the network. For example, the network providers may decide to save network bandwidth during business hours and fix the data bit rate at 6.4 kbps. After business hours, however, the network providers may increase and fix the data bit rate at 11.2 kbps. Yet, the network providers may allocate certain lines for high quality speech data transfer during specific hours. The invention of claim 16 provides for enhancing the installed networks, which utilize such fixed bit-rate encoders. According to claim 16, a rate determinator module is provided and connected to the installed speech coding system, where the rate determinator module receives a plurality of speech signal frames, determines a data rate of one of the speech signal frames by said rate determinator and selects one of the installed plurality of speech encoders according to the data rate, where the installed plurality of speech encoders includes a fixed bit-rate encoder incapable of rate determination.

As stated above, Stewart describes variable rate encoders and fails to disclose, teach or suggest that a rate determinator can be added to installed networks to work in conjunction with fixed bit rate encoders to process speech signals frame-by-frame.

Further, the Examiner states that Stewart discloses that "said first encoder is a fixed bit-rate encoder" at col. 3, lines 17-20, where Stewart reads: "The system provides optimum voice quality and system capacity in that it allows specific encoders to decrease their rate, which improves capacity, as necessary while allowing other encoders to maintain their rates."

Applicant has thoroughly studied the Stewart reference and believes that the Examiner has been misinterpreting the phrase "allowing other encoders to maintain their rates" in Stewart and that this phrase has been taken out of context and does not indicate that encoder(s) in Stewart run at a fixed rate. First, it is noteworthy to discuss Stewart's proposal. According to Stewart:

> A block diagram of the TIA IS-96 standard processing performed by the DSP or other device used to implement the speech encoder (105) is shown in FIG. 2. As shown, speech encoder (105) can be broken down into two main elements: rate determination and encoding. Consider first the rate determination function. In the IS-96 standard, each speech encoder (105) divides its associated PCM signal stream into contiguous 20 ms frames consisting of 160 samples of the source speech waveform. The power level of each frame (which is the zeroth lag R(0) of the autocorrelation function estimate of the frame produced by the autocorrelation estimator (200)) is fed to a bank of comparators (203) which establish which of three monotonic-increasing threshold levels the frame power exceeds. These levels are generated by 2nd order interpolation of a non-linear average of the power level of the speech signal formed by block (201). Note that all these processing steps are completely defined in TIA standard IS-96. If the current frame energy is less than the lowest of the three thresholds, the frame is declared an 1/8 rate frame; if the frame energy lies between the lowest and middle of the thresholds, the frame is declared a 1/4 rate frame; if it is between the middle and highest threshold, the frame is the declared a 1/2 rate frame; and finally, if the frame energy exceeds the highest threshold level, the frame is declared a full rate frame. This final step is performed by comparators (203) and decoder (204) to produce the selected rate (205). (Col. 4, lines 29-55.)
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> It is clear from FIG. 1 and FIG. 2 that, in the prior art, the encoded rate of each forward link speech encoder is determined in isolation. That is the encoded rate of each 64 kbps voice link is determined exclusively by signal processing that speech signal. ... [I]t is also clear that in order to operate at the maximum possible rate since each encoder operates in isolation and has no knowledge of the total power (and hence system self -

> interference) being emitted at the base station antenna (112). Since speech quality must be sacrificed to achieve low mean encoded rates, this implies that overall system speech quality is unnecessarily sacrificed when the system is not at its maximum capacity .... (Col. 5, lines 45-62.)

In other words, according to Stewart, the problem is that each encoder determines the encoding rate in isolation without having any knowledge of the total power, and sacrifices speech quality to achieve low mean encoded rates. Now, the solution that Stewart proposes is as follows:

> The method shown in FIG. 4 can be used to overcome these deficiencies. In FIG. 4, each speech encoder (105) evaluates, for each 20 ms frame, the perceptually weighted error metric (401) produced by encoding the speech frame at each of the four candidate rates (more than four rates may be possible in alternate embodiments). This information is then passed back to a supervising rate controller (404). Rate controller (404) then forms a rate/quality table similar to that of FIG. 5, which depicts the perceptually-weighted error produced by encoding at each of the candidate rates for each of the N speech encoders reporting to the rate controller. (Col. 6, lines 14-24.)
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> A simple approach to optimizing the overall voice quality of the cell or sector starts by assuming that all N voice channels have equal transmit power. All of the encoders (105) are placed in the lowest candidate rate and the total transmit power P is calculated by rate controller (404). In this case, P is simply equal to the sum of the rate values for all N encoders, where the rate value for 1/8 rate is 1/8, for 1/4 rate is 1/4, and so on. Rate controller (404) then finds the largest entry in the rate/quality table corresponding to the current candidate rate for any of the N encoders. This is equivalent to identifying the encoder with the worst voice quality (i.e. the largest perceptually weighted error) for the current set of selected rates. The rate for that encoder is increased to the next highest rate, and P is recalculated. This process continues until P exceeds some total power threshold T at which time the procedure terminates. An improved approach would be to apply the procedure to rate/quality table entries which have been weighted by the transmit gain associated with each encoder. This would be extracted from power level block (110). It will be appreciated by one of ordinary skill in the art that the overall effect of this procedure is to reduce power by sacrificing the rate of those encoders which will suffer the least reduction in quality by operating at a lower rate. (Col. 6, lines 25-48.)

Accordingly, rate controller 404 of Stewart is not designed to maintain the encoding rate of any of the speech encoders (105) at a particular rate, but sets the rate of each speech encoder (based on information from each speech encoder (105) regarding the perceptually weighted error metric (401) produced by encoding the speech frame at each of the four candidate rates) in order to transmit as close as possible to maximum allotted system power. Therefore, the word "maintain" as relied upon by the Examiner in Stewart is not a reference to making speech encoders 105 to run at fixed rates. To the contrary, the scheme of Stewart would fail under such circumstances, since rate controller 404 must be able to adjust the rates in order to "maintain the overall transmitted power to be less than some threshold T." (Col. 6, lines 52-53.) (See, also claim 1 of Stewart.) Accordingly, Stewart is addressing a different system and a different solution than those addressed in the present application.

Applicant believes that, at best, the reference to "allowing other encoders to maintain their rates" refers to "average" or "overall" rate of certain encoders and not "fixing" certain encoders to a particular rate, as there is no support in Stewart, whatsoever, that speech encoders are fixed at a particular rate. To the contrary, Stewart explicitly describes variable rate encoders (col. 3, line 65) in conjunction with variable encoding standard TIA IS96 (col. 4, line 29) and further states that each speech encoder (105) includes rate determination capability (col. 4, lines 31-34.)

Accordingly, Stewart fails to disclose, teach or suggest that a rate determinator can be added to installed networks to work in conjunction with fixed bit rate encoders to process speech signals frame-by-frame.

Furthermore, to establish a prima facie case of obviousness, there must be some teaching or suggestion by the references to add a rate determinator to installed networks to work in conjunction with fixed bit rate encoders to process speech signals frame-by-frame. Generally speaking, many inventions are the result of inventive combinations of existing elements, and it is not sufficient for the Examiner to find various elements in some references or well known prior art without showing how one reference or well known prior art teaches or suggests the desirability of making the combination that the Examiner alleges. Applicant would like to direct the Examiner's attention to the guidance provided by the Federal Circuit below:

> "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious *unless the prior art suggested the desirability of the modification*" (emphasis added) (In re Gordon, 733 F.2d 900, 902 (Fed. Cir. 1984) (see also In re Fitch, 972 F.2d 1260 (Fed. Cir. 1992)).
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> In a proper obviousness determination, "whether the changes from the prior art are 'minor', ... the changes must be evaluated in terms of the whole invention, including whether the prior art provides any teaching or suggestion to one of ordinary skill in the art to make the changes that would produce the patentee's ... device." (citations omitted.) This includes what could be characterized as simple changes, as in *In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. (BNA) 1125, 1127 (Fed. Cir. 1984)* (**Although a prior art device could have been turned upside down, that did not make the modification obvious unless the prior art fairly suggested the desirability of turning the device upside down**). (emphasis added) (In re Chu, 66 F.3d 292, 298 (Fed. Cir. 1995)).

Applicant respectfully submits that the cited references fail to disclose, teach or suggest the desirability of adding a rate determinator to installed networks to work in conjunction with fixed bit rate encoders to process speech signals frame-by-frame. Accordingly, applicant respectfully submits that claim 16, and its dependent claims 17-22, 45 and 48, should be allowed. Further, independent claim 22, and its dependent claims 23-27 and 49, should also be allowed for similar reasons.

C. Rejection of Claims 2, 7 and 17 Under 35 USC § 103(a)

The Examiner has rejected claims 2, 7 and 17 under 35 USC § 103(a) as being unpatentable over Stewart in view of well known prior art and Otani, and further in view of Taumi et al. (USPN 6,006,178) ("Taumi"). Applicant respectfully disagrees; however, in order to expedite the prosecution of the present application, applicant has canceled claims 2 and 7, as to which, the Examiner's rejection has been rendered moot.

Further, applicant respectfully submits that claim 17 depends from claim 16 and should be allowed at least for the same reasons stated above in conjunction with patentability of claim 16.

D. Conclusion

For all the foregoing reasons, an early allowance of claims 16-27, 45, 48 and 49 pending in the present application is respectfully requested. The Examiner is invited to contact the undersigned for any questions.

Respectfully Submitted;
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